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IMPROPER INTEGRALS

Mathematics is one of the oldest sciences that emerged at the dawn of civilization. It is constantly enriched, periodically updated and approved as a means of knowledge of the laws of the world. Math helps the humanity to discover and use the laws of nature. Nowadays it is a powerful driving force for the development of science and technology.

Elements of integral calculus can be found in the works of the mathematicians of the ancient Greece. The basic concepts and the grounds of integral calculus theory, its connection with differential calculus, its application to solve practical problems were worked out in the end of the 17th century by Isaac Newton and Gottfried Leibniz. The historical development of integral calculus is associated with the names of Leonhard Euler, Augustin-Louis Cauchy, Bernhard Riemann and others.

Integral is one of the central concepts of mathematics. Its emerging resulted from two main problems: the reconstruction of function for the given derivative and calculating the base area constrained by the function graph$y = f(x)$, $x \in [a, b]$, lines $x = a, y = b$ and oriented line OX. In 1690 Jacob Bernoulli introduced the term "integral". In the history of mathematics the term is associated with two Latin words: «integro» – recapture and «integer» – whole.

The two above mentioned problems lead to two interconnected types of integrals: antiderivative and definite ones. The study of properties and calculation of these integrals are the main problems of integral calculus. The given defined integral in the border set of integral sum, while the interval of integration is finite, and the integral function of that interval is constrained. If at least one of these conditions is broken the above given definition of definite integral will become unaccepted: in case of endless interval of integration it cannot be divided into n frequency-response intervals of a finite length, and in case of unbounded function the integral sum has no finite border set. To generalize the concept of the definite integral in the above mentioned examples we get an improper integral, i.e. the integral of the function on the infinite open interval or of an unbounded function.

The study of improper integrals introduces the methods and ways of calculating these integrals. We can also study the conditions of improper integrals existence use, the acquired knowledge to solve different mathematical problems.

LITERATURE

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